

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application of)
SUZUKI) **Unit 2183**
Application Number: 10/821,889)
Filed: April 12, 2004)
For: DISK ARRAY APPARATUS)
ATTORNEY DOCKET NO. ASAM.0120)

**Honorable Assistant Commissioner
for Patents
Washington, D.C. 20231**

PETITION TO MAKE SPECIAL UNDER 37 C.F.R. § 1.102(d)

FOR ACCELERATED EXAMINATION

Sir:

Pursuant to 37 C.F.R. § 1.102(d), Applicants respectfully request that the application to be examined on the merits in conjunction with the pre-examination search results, the detailed discussion of the relevance of the results and amendments as filed concurrently.

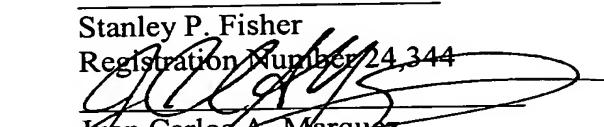
Substantive consideration of the claims is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and telephone number indicated below.

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Respectfully submitted,

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April 22, 2005
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STATEMENTS & PRE-EXAMINATION SEARCH REPORT
SUPPLEMENTAL TO
THE PETITION TO MAKE SPECIAL

Sir:

Pursuant to 37 C.F.R. §§ 1.102 and MPEP 708.02 VIII, Applicants hereby submit that (1) all claims of record are directed to a single invention, or if the Office determines that all the claims presented are not obviously directed to a single invention, will make an election without traverse as a prerequisite to the grant of special status; (2) a pre-examination search has been conducted according to the following field of search; (3) copies of each reference deemed most closely related to the subject matter encompassed by the claims are enclosed; and (4) a detailed discussion of the references pointing out how the claimed subject matter is patentable over the references is also enclosed herewith.

FIELD OF THE SEARCH

The field of search covered the following classes:

<u>Class</u>	<u>Subclasses</u>	<u>Description</u>
707/		DATA PROCESSING: DATABASE AND FILE MANAGEMENT OR DATA STRUCTURES
200		FILE OR DATABASE MAINTENANCE

710/	ELECTRICAL COMPUTERS AND DIGITAL DATA PROCESSING SYSTEMS: INPUT/OUTPUT	
	1	INPUT/OUTPUT DATA PROCESSING
	8	.Peripheral configuration
	13	..By detachable memory
711/	ELECTRICAL COMPUTERS AND DIGITAL PROCESSING SYSTEMS: MEMORY	
	114	.Arrayed (e.g., RAIDs)
715/	DATA PROCESSING: PRESENTATION PROCESSING OF DOCUMENT, OPERATOR INTERFACE PROCESSING, AND SCREEN SAVER DISPLAY PROCESSING	
	734	.. Interactive network representation of devices (e.g., topology of workstations)
	736	...Network managing or monitoring status

The above subclasses represent areas deemed to contain subject matter of interest to one or more of the search features. The integrity of the search is based on the records as presented by the United States Patent and Trademark Office (USPTO). Also a key word search was performed on the USPTO full-text database including published U.S. patent applications.

The search was directed to claims 1-15 of U.S. Application 10/821,889. The claims as generally characterized by a disk array system connectable to a host, comprising: a plurality of hard disk drives; an input/output control portion for controlling data input/output between a host and hard disk drives; a plurality of paths for connecting hard disk drives and an input/output control portion; and modules each accommodating a predetermined number of hard disk drives; wherein, when a number of hard disk drives is increased or decreased, a disk array system displays other hard disk drives or modules connected to paths different from a path connected to hard disk drives to be increased or decreased.

LIST OF RELEVANT REFERENCES

The search revealed the following U.S. patents or applications, which are listed for convenience:

U.S. Patent No. Inventor

5,940,629	Rikukawa et al.
5,956,665	Martinez et al.
6,384,842	DeKoning et al.
6,820,175	Fujimoto

Discussion of References:

U.S. Patent No. 5,940,629 to **Rikukawa** et al. assigned to Sony Corporation is entitled “System for Selecting Drive Replacement and Opening Information Transmission Path After Replacement Permission of the Selected Drive is Granted.” **Rikukawa**’s information managing apparatus 1 (Fig. 1) includes an accommodation unit 3 for accommodating a recording media 2, a plurality of replaceable drives 4 for performing reproduction and/or recording on the media 2, and transfer means 5 for taking out a desired recording medium from the accommodation unit 3 and transferring it to one of the drives 4. A control means 7 performs a control to reproduce requested information from the media 2 with the drives 4 in response to an instruction from an external apparatus 8 and provides the information to the external apparatus 8 (col. 3, lines 1-6 and 18-24). A liquid crystal display 23, which corresponds to display means 9, is attached to a front of panel 13a of an outer chassis 13 (col. 4, lines 56-58). A procedure for replacing a tape drive unit 18 is discussed. At step S1, an operator changes over a switch 18a that is attached the tape drive unit 18 to a replacement request position. At step Sd, a library controller 25 gives replacement permission to the tape drive unit 18 and causes the liquid crystal display 23 to display a message regarding the replacement. Confirming the displayed content, at step S2, the operator performs an operation of replacing the tape drive unit 18 (Figs. 4 and 8; col. 7, lines 9-12 and 24-29). **Rikukawa** allows an operator to physically remove a tape drive unit 18, but does not concern properly reorganizing/regrouping (increasing or decreasing) disk drives existing in the disk array into a RAID group with evenly/uniform connection to physical paths P0, P1, P2, P3 or physical rackmount disk expansion chassis 100, 200, 300 and 400 (P. 10, lines 9-18 of the specification of the invention). **Rikukawa** does not provide modules/chassis accommodating a predetermined number of hard disk drives in a disk array system. **Rikukawa**’s liquid crystal display 23 only displays a message regarding the replacement of a tape drive unit 18, but not any “other hard disk drives specifically connected to *paths different from a path* connected to hard disk drives to be increased or decreased” as recited in claim 1 or “other hard disk drives

accommodated in *modules different from said module* accommodating said hard disk drives to be increased or decreased" as recited in claims 7 and 15.

U.S. Patent No. 5,956,665 to **Martinez** et al. assigned to Digital Equipment Corporation is entitled "Automatic Mapping Monitoring, and Control of Computer Room Components." **Martinez**'s computing system 20 (Fig. 1) includes various cabinets 22 and shelves 24. Each shelf 24 contains components 25, also known as field replaceable units (FRUs), including eight disk drives 26 and an environmental monitoring unit (EMU) 28 (col. 6, lines 64-66). A PC/server 32 has a display 34 provided with a graphical user interface (GUI) 36 (col. 5, lines 14-18, 23-24 and 59-61). The EMU 28 can act as a communications gateway to a GUI 36. The GUI 36 has the ability to track changes in the configuration of components 25 of the computing system 20 (col. 8, lines 32-37). Reconfigurations can involve the removal of the shelf 24 of the components 25 or the removal of an individual disk drive 26 from the shelf 24. The GUI 36 also has the ability to locate a component 25 within a cabinet 22, a shelf 24 within the cabinet 22, or the cabinet 22 itself. The GUI 36 can formulate the appropriate message to transmit to the EMU 28 of the shelf 24 in the cabinet 22 where the component 25 is located. **Martinez** does not involve a host or an input/output control portion (col. 11, lines 43-45 and 51-53). **Martinez** simply displays the physical the physical locations, status, and characteristics of the devices in a single shelf of the cabinet in Fig. 6, but not concern properly reorganizing/regrouping (increasing or decreasing) disk drives existing in the disk array into a RAID group with evenly/uniform connection to physical paths P0, P1, P2, P3 or physical rackmount disk expansion chassis 100, 200, 300 and 400 (P. 10, lines 9-18 of the specification of the invention). As such, **Martinez** does not display any "other hard disk drives specifically connected to paths different from a path connected to hard disk drives to be increased or decreased" as recited in claim 1 or "other hard disk drives accommodated in modules different from said module accommodating said hard disk drives to be increased or decreased" as recited in claims 7 and 15.

U.S. Patent No. 6,384,842 B1 to **DeKoning** et al. assigned to LSI Logic Corporation is entitled "User Interface to Provide a Physical View of Movable Physical Entities." **DeKoning**'s system 20 (Fig. 1) includes a RAID storage array or a memory system 24 (col. 5, lines 54-57). The system 20 also includes a computer system 44 that is in communication with a host apparatus 28 by means of a computer apparatus 48. The computer apparatus 48 includes a monitor having a display screen, executes and controls under user directions/inputs, one or more

software modules or programs for correlating or providing correspondence between actual RAID subsystem components 40 and a number of graphical representations of the components 40. A drive tray 92-4 having a set of drives 96-4 (Fig. 5) may be added to a slot 130-10 of a subsystem 2 (40-2 in Fig. 2). The addition of drive module 92-4 to the subsystem 2 results in the host system 24 notifying the computer system 44 that the disk drives 96-4 have been added to the subsystem 2. A user can retrieve graphical representations that correspond to relative and absolute physical locations of the components 40 in order to obtain current status information on one or more components 40 (col. 6, lines 28-31, 34-39 and 40-42; col. 10, lines 17-24, 54-57). When certain status indicates to the user that a change should be made to the component 40 based on the graphical representation, the user can immediately correlate the system component 40 having such status information with its actual physical location. Immediate physical access can be made of the actual system component 40 for taking any appropriate action including, addition, removal, replacement, and/or shifting of the system components 40 or modules (col. 11, lines 13-23). **DeKoning** simply displays the physical insertion of physical drives 96-4 in a slot 130-10 of the subsystem 2 (Col. 10, lines 17-19) in Fig. 5 which were not in the system before the insertion, but not concern properly reorganizing/regrouping (increasing or decreasing) existing disk drives existing in the disk array into a RAID group with evenly/uniform connection to physical paths P0, P1, P2, P3 or physical rackmount disk expansion chassis 100, 200, 300 and 400 (P. 10, lines 9-18 of the specification of the invention). **DeKoning** neither display any “other hard disk drives specifically connected to paths different from a path connected to hard disk drives to be increased or decreased” as recited in claim 1 or “other hard disk drives accommodated in modules different from said module accommodating said hard disk drives to be increased or decreased” as recited in claims 7 and 15.

U.S. Patent No. 6,820,175 B2 to **Fujimoto** assigned to Hitachi, Ltd. is entitled “Storage System Disk Control Cluster, and Its Increase Method.” **Fujimoto**’s storage system 1 (Fig. 1) includes a plurality of disk control clusters 1-1 to 1-n and a front-end switch 7. The disk control cluster 1-1 has interface units 11 interfacing with a host computer 3, and interface units 16 interfacing with disk drives 2 (Abstract; col. 6, lines 51-56). GSW port/cluster correspondence tables 400 and a cluster/logical volume corresponding table 405 are stored in a global information control unit 21 to be rewritten by a service processor (SVP). A notebook type personal computer can be used as the SVP, and the tables 400, 405 can be displayed on a display

screen of the notebook computer (Figs. 16-17; col. 20, lines 51-67). A disk control cluster can be added to the storage system 1 by rewriting port numbers associated with a cluster number on the display and arranging the tables 400, 405 accordingly (col. 21, lines 2-5, 18-19). **Fujimoto** merely activates/increases a cluster 5 and designates existing logic volumes 16640~20735 corresponding to the cluster 5 and display the tables before and after the cluster-addition in Figs. 16-17. **Fujimoto** simply does not concern physical paths P0, P1, P2, P3 connecting the physical disk drives with disk adopters 33-36, or physical rackmount disk expansion chassis 100, 200, 300 and 400 so as to properly increase or decrease disk drives existing in the disk array into a RAID group with evenly/uniform connection to the physical paths P0, P1, P2, P3 or the physical rackmount disk expansion chassis 100, 200, 300 and 400 (P. 10, lines 9-18 of the specification of the invention). **Fujimoto** only displays the tables 400, 405, but not any “other hard disk drives specifically connected to paths different from a path connected to hard disk drives to be increased or decreased” as recited in claim 1 or “other hard disk drives accommodated in modules different from said module accommodating said hard disk drives to be increased or decreased” as recited in claims 7 and 15.

Conclusion

Based on the results of the comprehensive prior art search as discussed above, Applicants contend that the disk array system as recited in independent claims 1, 7 or 15 especially the features of “displaying other hard disk drives specifically connected to paths different from a path connected to hard disk drives to be increased or decreased” or “displaying other hard disk drives accommodated in modules different from said module accommodating said hard disk drives to be increased or decreased” is patentably distinct from the cited prior art references.

In particular, the disk array system of the invention (for example, the embodiment depicted in Figs. 1 & 5) connectable to a host 10, comprising: a plurality of hard disk drives 101, 102, etc; an input/output control portion 50 for controlling data input/output between said host 10 and said hard disk drives 101, 102, etc; a plurality of paths P0, P1, P2, P3 (p. 15, lines 10-16) for connecting said hard disk drives 101, 102, etc and said input/output control portion 50; and modules (e.g., rackmount disk expansion chassis 100, 200, 300 and 400; p. 15, lines 22-24) each accommodating a predetermined number of said hard disk drives. As recited in claim 1, when a number of said hard disk drives is increased or decreased, said disk array system displays other

hard disk drives or modules connected to paths different from a path connected to said hard disk drives to be increased or decreased. As recited in claims 7 and 15, wherein, when a number of said hard disk drives is increased or decreased, said disk array system displays other hard disk drives accommodated in modules different from said module accommodating said hard disk drives to be increased or decreased.

Claim 15 further recites that when a group constituted by said predetermined number of hard disk drives is *increased*, among hard disk drives not used, hard disk drives not used accommodated in modules different from a module accommodating a selected hard disk drives are displayed, and that when the number of said hard disk drives is *decreased* in said group constituted by said predetermined number of hard disk drives, other hard disk drives accommodated in modules different from a module accommodating a selected hard disk drive are displayed.

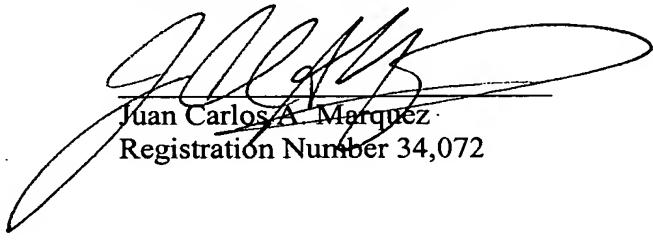
In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable consideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the

above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

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